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Subject: Safety and Mission Assurance (SMA) Audits, Reviews, and Assessments

Responsible Office: Office of Safety and Mission Assurance

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Chapter 3. Safety and Mission Success Review (SMSR)

3.1 Overview

3.1.1 The SMSR is a review held to prepare Agency safety and engineering management to participate in program final readiness reviews preceding flights or launches, including experimental/test launch vehicles, or other reviews as determined by the Chief, Safety and Mission Assurance. The SMSR provides the knowledge, visibility, and understanding necessary for senior safety and engineering management to either concur or nonconcur in program decisions to proceed with a launch or significant flight activity.

3.1.2 SMSRs can be NASA Headquarters-led or NASA Center-led.

3.1.3 NASA Headquarters-led SMSRs are conducted for any activity requiring Mission Directorate-level or higher level decision to proceed.

3.1.4 NASA Center-led SMSRs are conducted for any activity requiring lower than a Mission Directorate-level decision to proceed. NASA Center-led SMSRs are led by Center safety management as the delegated SMA TA.

3.1.5 The Chief, Safety and Mission Assurance or the Chief Engineer may request a SMSR (either NASA Headquarters-led or Center-led) for other safety and mission success-critical program or project activities to assure all risks are mitigated to an acceptable level, including:

a. Test readiness reviews, design certification reviews, indemnification cases, and extravehicular activities.

b. Reviews of tailoring or nonconformity of program/project SMA or engineering requirements which may affect mission success or facility operations.

3.1.6 The SMSR is designed to:

- a. Review and affirm the results of assurance processes and requirements which have been implemented over the life of the program, including review of the program/project-developed SMA mission assurance process map and mission assurance process matrix.
- b. Verify compliance with the applicable requirements.
- c. Provide adequate knowledge and visibility for senior safety and engineering managers to understand the risks associated with the safety and mission success of program launches, operational stages, or selected critical tests, utilizing input from cognizant program and Center-based safety and reliability review panels (e.g., ground safety, payload safety, range safety, facility safety).
- d. Examine mission preparation status, open work issues, and concerns.
- e. Assess overall systems readiness.
- f. Provide an SMA and engineering position on whether to concur or nonconcur in proceeding with the event/operation being reviewed.

3.1.7 Data presented at the NASA Headquarters-led SMSR is developed by the program, cognizant NASA Headquarters and NASA Center SMA and engineering organization(s), the NSC, other independent assessment groups (e.g., NESC, NASA IV&V Program, Center-based independent assessment organizations), applicable safety review panels, and any individuals or organizations representing minority or dissenting opinions.

3.1.8 SMSR records shall be prepared and retained onsite; then destroyed six years after mission completion by the office that conducted the SMSR (Headquarters or delegated Center SMA TA).

3.2 Roles and Responsibilities

3.2.1 The Chief, Safety and Mission Assurance shall:

- a. Co-chair each NASA Headquarters-led SMSR (Requirement).
- b. Conduct a poll of selected SMSR participants at the conclusion of the NASA Headquarters-led SMSR for a recommendation to proceed (Requirement).
- c. Decide whether to recommend proceeding or not proceeding to the next level of review (ex: Flight Readiness Review (FRR), Mission Readiness Briefing (MRB), or other, depending on which Mission Directorate is involved) (Requirement).
- d. Communicate any concerns arising from the review with the Associate Administrator for the Mission Directorate involved (Requirement).
- e. Designate an OSMA SMSR Manager (Requirement).

3.2.2 The Chief Engineer shall:

- a. Co-chair each NASA Headquarters-led SMSR (Requirement).
- b. Decide whether to recommend proceeding or not proceeding to the next level of review (ex: FRR, MRB, or other, depending on which Mission Directorate is involved) (Requirement).
- c. Communicate any concerns arising from the review with the Associate Administrator for the Mission Directorate involved (Requirement).

3.2.3 Center Directors shall provide the logistic and resource support required for successful execution of NASA Headquarters-led and NASA Center-led SMSR activities (Requirement).

3.2.4 Center SMA Directors and Center Engineering Directors shall:

- a. Participate in the NASA Headquarters-led SMSR process for each program/project applicable to their Center (Requirement).
- b. Direct the implementation of a Center-led SMSR process for reviews chaired below the Mission Directorate level in which the Center SMA Organization is asked to concur/nonconcur (Requirement).
- c. Coordinate with program/project management and Center procurement organizations to ensure that contracts provide for contractor support of NASA Headquarters-led and Center-led SMSR activities (Requirement).
- d. Complete SMSR actions within the assigned timeframe (Requirement).

3.2.5 The delegated SMA TA shall:

- a. Chair each Center-led SMSR (Requirement).
- b. Conduct a poll of selected SMSR participants at the conclusion of the Center-led SMSR for a recommendation to proceed (Requirement).
- c. Ensure that the basic elements of a Center-led SMSR, at a minimum, address the NASA Headquarters-led SMSR elements and, to the extent possible, parallel NASA Headquarters-led SMSR residual risk reporting formats (Requirement).
- d. Complete SMSR actions within the assigned timeframe (Requirement).

3.2.6 Program/project managers shall:

- a. Provide the support needed to prepare and present material to NASA Headquarters-led and Center-led SMSRs (Requirement).

Note: SMSR presentations are tailored for each specific mission and content is negotiated in advance of the SMSR.

- b. Ensure that program/project material presented at a SMSR, including the mission assurance process map and mission assurance process matrix, is accurate and meets the specified needs of the SMSR (Requirement).
- c. Coordinate with Center SMA and Center procurement organizations to ensure that contracts provide for contractor support of NASA Headquarters-led and Center-led SMSR activities (Requirement).

Note: This includes contractor support that may be needed to prepare SMSR

presentations or present information at the SMSR.

d. Complete SMSR actions within the assigned timeframe (Requirement).

3.2.7 SMA managers (including Chief Safety and Mission Assurance Officers (CSOs)) and engineering managers reporting (matrix or direct) to the program/project manager shall:

a. Help to identify all independent organizations which have assessed portions of the program or project (Requirement).

b. Provide material input for inclusion in SMSRs (Requirement).

c. Compile the program/project SMSR material, including the program's assessment of residual safety and mission success risk related to the upcoming milestone, identifying risk consequence and likelihood with supporting rationale and uncertainty associated with estimated likelihood (Requirement).

d. Coordinate the presentation of the Center and program/project SMSR material with the Chief, Safety and Mission Assurance (Requirement).

e. Coordinate within the program/project and support NASA Headquarters-led and Center-led SMSR preparation meetings, as required (Requirement).

f. Participate in SMSR polling as described in paragraphs 3.2.1.b and 3.2.5.b (Requirement).

g. Complete SMSR action items within the assigned timeframe (Requirement).

3.2.8 Other independent assessment organizations (e.g., NESC, NASA IV&V Program, Center-based independent assessment organizations) shall:

a. Identify program/project assessments conducted by their respective organizations, summarize, and provide them to the OSMA SMSR Manager to ensure that the Chief, Safety and Mission Assurance has all relevant data at the SMSR and to avoid duplication of effort on the part of other independent assessment organizations (Requirement).

b. Identify any issues or SMA residual risks related to their respective assessments (Requirement).

c. Identify any areas where the findings of the independent assessments differ from the program/project assessment (Requirement).

d. Participate, as applicable, in SMSR polling described in paragraph 3.2.1.b and 3.2.5.b (Requirement).

e. Complete SMSR action items within the assigned timeframe (Requirement).

3.2.9 The OSMA SMSR Manager shall:

a. Coordinate with the OSMA Mission Support Division, the Safety and Assurance Requirements Division, and Center-based SMA managers to identify which pending program and project events warrant a SMSR (Requirement).

b. Coordinate with the Office of the Chief Engineer, OSMA, Center-based SMA managers, and independent assessment organizations (e.g., NESC, NASA IV&V

Program, Center-based independent assessment organizations) to identify participants for a NASA Headquarters-led SMSR (Requirement).

c. Coordinate with the Office of the Chief Engineer, OSMA, Center-based SMA managers, and independent assessment organizations (e.g., NESC, NASA IV&V Program, Center-based independent assessment organizations) to establish an appropriate integrated schedule for NASA Headquarters-led and Center-led SMSRs and agenda for upcoming NASA Headquarters-led SMSRs (Requirement).

d. Coordinate with the program/project SMA and engineering managers to establish the team members for the SMSR polling group in coordination with the Chief, Safety and Mission Assurance and the Chief Engineer (Requirement).

e. Maintain and update, based on operational experience, detailed SMSR process documentation and work instructions (Requirement).

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